MEASURING ELECTRONIC BUSINESS

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Abstract

This paper describes the United States Census Bureau's e-business measurement program. The paper describes our e-business framework and associated definitions, related measurement complexities, our measurement strategy, funded research activities, and the ambitious measurement program now underway. The paper concludes with a summary of lessons learned.

1. INTRODUCTION

The growth, integration, and sophistication of information technology and communications is changing our society and economy. Today, computers and other electronic devices increasingly communicate and interact directly with other devices over a variety of networks, such as the Internet. Consumers and businesses have been particularly quick to recognize the potential and realize the benefits of adopting new computer-enabled networks. Consumers now routinely use computer networks to identify sellers, evaluate products and services, compare prices, and exert market leverage. Businesses use networks even more extensively to conduct and re-engineer production processes, streamline procurement processes, reach new customers, and manage internal operations. This electronic revolution in our economy is spurring additional investments in facilities, hardware, software, services, and human capital. Ultimately, it may change the structure and performance of the American economy as much as the introduction of the computer a generation ago.

While the burgeoning use of electronic devices in our economy is widely acknowledged and discussed, it remains largely undefined and unrecognized in official economic statistics. The Census Bureau has initiated an aggressive program to begin filling the data gap. This paper describes the Census Bureau e-business framework definitions, measurement complexities and strategy, and data collection plans. The fact that electronic business is in its infancy, yet growing and changing rapidly, poses special problems. A summary of the lessons we have learned over the first year of this initiative is provided at the end of the paper.

When considering the electronic revolution taking place in our economy, we must recognize that these changes take place in a larger economic context. For example, global competition, interest rates, laws and regulations, social concerns, industry traditions, and consumer preferences are all part of the broader "environment" which can affect all business activities. Similarly, electronic and non-electronic businesses share an infrastructure of available economic resources, including natural resources, utilities, structures, equipment, telecommunication and other services, employees, and workforce skills. While keeping this larger economic context in mind, the emphasis in this paper is to describe and encourage understanding of the "electronic" portion of our overall economy.

It is useful to think of the electronic economy as having three primary components--supporting infrastructure, electronic business processes (how business is conducted), and electronic commerce transactions (buying and selling). These components are defined and discussed in the following section. In addition, it is important to note that a common feature of both electronic business processes and electronic commerce transactions is reliance on the use of computer-mediated networks. It is reliance on the use of computer networks, and the benefits this can provide, that is the "bottom line" difference between electronic and other kinds of business. This important shared feature is also defined and discussed in next section.

2. MEASUREMENT FRAMEWORK AND DEFINITIONS

One of our first challenges was defining what we wanted to measure. Early on it became clear that policymakers, industry, and the media used a variety of terms to

describe electronic economic activity. Moreover, we found that these terms often were used interchangeably and with no common understanding of their scope or relationships. Consequently, we determined that establishing specific terms that clearly and consistently describe our growing and dynamic networked economy was a critical first step in developing useful statistics about it. During the Summer 1999, the Census Bureau developed definitions and concepts to describe the electronic economy. Our starting point was a thorough review of related work undertaken by other National statistical agencies and we borrowed heavily from work done by Statistics Canada and others. We also have participated in an OECD task force charged with developing electronic commerce definitions.

The three primary components of our electronic economy, and the feature shared by two of them, are defined below. Each definition includes examples of its scope and content, both to clarify and elicit reactions . The definitions are intentionally broad to provide an inclusive framework for planning statistical measures, and to allow flexibility to incorporate continuing changes in the electronic economy.

E-business infrastructure is the share of total economic infrastructure used to support electronic business processes and conduct electronic commerce transactions. It includes hardware, software, telecommunication networks, support services, and human capital used in electronic business and commerce. Examples of e-business infrastructure are:

- Computers, routers, and other hardware
- Satellite, wire, and optical communications and network channels
- System and applications software
- Support services, such as web site development and hosting, consulting, electronic payment, and certification services.
- Human capital, such as programmers.

Electronic business (e-business) is any process that a business organization conducts over computer-mediated network channels. Business organizations include any for-profit or nonprofit entity. Examples of major electronic business process categories include online purchasing, selling, production management, logistics, as well as internal communication and support services. Within each major category one can identify more specific processes. For example, online purchasing includes the following online processes: access to vendors' products/catalogs, ordering from vendors, electronic payment to vendors, vendor managed inventory, use of electronic marketplaces and online auctions. Internal processes include: email capabilities, automated employee services, training, information sharing, video conferencing, recruiting, and telecommuting.

Electronic commerce (e-commerce) is any transaction conducted over computer-mediated network channels that transfers ownership of, or rights to use goods or services. A transaction is an event occurring within selected e-business processes (e.g., the selling process). An e-commerce transaction is "completed" when agreement is reached between the buyer and seller online to transfer the ownership or rights to use goods or services. This electronic agreement is the trigger for determining an e-commerce transaction, not the payment. Only priced transactions will be measured. Downloads of free software, for example, will not be measured. Examples of e-commerce transactions include the sale of a book or CD over the Internet, an electronic marketplace selling parts to another business, a manufacturing plant selling electronic components to another plant within the company using the company's Intranet, a manufacturer selling to a retailer over an EDI network.

Computer-mediated networks are electronically inked devices that communicate interactively over network channels. A variety of electronic devices can be linked, including computers, Internet-enabled cellular phones, personal digital assistants,

WebTV, and telephones linked with interactive telephone systems. Such links generally involve minimal human intervention though increasingly e-businesses are providing the capability of "chatting" with a customer support representative. Networks include the Internet, Extranets, Electronic Data Exchange (EDI) networks, and telecommunication networks. Networks can be either open or closed.

3. MEASUREMENT COMPLEXITIES

Identifying and measuring e-commerce transactions is new for statistical agencies and it can be complicated. The simple example of an on-line retail book purchase illustrates some of these complexities and points out other measurement challenges that remain to be addressed.

- Example--John Doe logs onto his computer, accesses the "Bigbook.com" Internet site, identifies a rather obscure title, and purchases it for $20 plus a $4 delivery charge. John pays with his credit card and is told his book will be delivered in 3-5 days.

This simple example involves Bigbook's use of several **additional e-business processes**, assuming they are conducted over computer-mediated networks. These processes include electronic marketing to reach John, an electronic search to find the obscure title, electronic procurement and payment to obtain the book from a wholesaler or another dealer, electronic authentication of John's credit card information, electronic processing to obtain payment from a financial institution, electronic shipping arrangements for delivery of the book, and electronic customer support to e-mail John an acknowledgment, order number and expected delivery date. Understanding the effects of these processes on Bigbook's business operations and costs, its supplier and customer relationships, and its competitive industry position are a significant measurement challenge.

This example not only covers many business processes, these processes also involve **multiple e-commerce transactions**. These transactions include John Doe's purchase of the book from Bigbook and Bigbook's separate transactions with third parties to obtain order fulfillment services, acquire the book for resale, secure credit authentication services, provide payment processing services, and arrange for delivery of the book to John. As in any measurement program, we must decide what information to collect and from whom to collect it. Just as in the brick and mortar world answers to these determinations will depend on the characteristics of the transaction and the parties involved. For example, there is no question that we want to collect the value of the books sold by Bigbooks. However, for e-commerce purposes we also may want to collect information about shipping costs which often represent a significant portion of the total cost paid by the purchaser of the book. This shipping information will be useful in understanding e-commerce activity even though our existing retail trade survey does not collect shipping costs for catalog stores, another business where shipping costs can be significant. To measure electronic payment services we would not collect information on the total value of the transaction, but rather focus on the fee paid by Bigbooks for the payment service, probably a small percent of the total value. In terms of from whom to collect the information, we have two options just as in the physical world, buyer or seller. While we certainly could survey households regarding e-commerce purchases of books, the need to develop industry estimates makes surveys of the selling entities more attractive and generally, less expensive.

Understanding the industry classification system and its implications for e-commerce and e-business measures is a must for all prospective data users. The value of e-commerce transactions, like their brick and mortar counterparts, are aggregated and presented by the industry of the business entity selling the goods or services and any classification system will impose additional measurement constraints. For example, Bigbook would be classified in North American Industry Classification System (NAICS) retail industry 454110, Electronic Shopping and Mail-Order Houses along with traditional catalog stores. Data on employment, total sales, or e-commerce sales

would be provided for the industry as whole; typically information would not be broken out between electronic shopping and mail order houses and certainly not by merchandise lines such as books. Similarly, e-commerce related services such as credit card authentication or electronic payment processing will be found in NAICS industry 522320, Financial Transactions Processing, Reserve, and Clearinghouse Activities, along with check clearing services and various other processing activities. These examples are only meant to point out that the industry classification system may not satisfy all the data demands of an e-commerce analyst and survey managers will have to look for additional ways to supplement industry data. Finally, classifying emerging and rapidly evolving businesses engaged in e-commerce and e-business activities will remain a challenge for statistical agencies as many of these activities are truly new and do not fit cleanly into our existing industry "pigeon-holes".

The above example also points out that any given business-to-consumer transaction will involve a larger number of related business-to-business transactions. This **transactions multiplier effect** is not unique to e-business; however, its expected growth and continued change will add to the challenge of measuring e-business and e-commerce. Growth in transactions is expected because as e-commerce expands, related business-to-business transactions will become more fragmented; participants will concentrate on performing their highest valued-activities and rely increasingly on third parties for lower-value added activities. The measurement challenges of this growth include accounting for the increased volumes, identifying the new e-business players, maintaining up-to-date information for the known players, and avoiding double counting the value of related transactions.

Change in the scope and nature of e-commerce transactions is expected because electronic business methods permit the players to change their roles relatively easily and they increasingly will do so. Examples of changes in roles are today seen in manufacturers and wholesalers who now sell directly to consumers, and in the "virtual" integration of firms through informal alliances that link firms electronically. These new arrangements impose additional measurement challenges including

identifying the new players and their roles, maintaining up-to-date information on them and how their roles are changing, and updating data collection methods (such as including a direct-sale "manufacturers" in an appropriate "retail" sales survey frame).

4. MEASUREMENT STRATEGY

Our measurement strategy is multi-faceted, yet purposeful and is tempered by reductions in our FY 2000 budget (October 1999-September 2000). The key characteristics of our e-business measurement strategy are described below.

- **Achieve and exploit first mover status.** We thought it imperative to begin measuring and understanding the electronic economy sooner rather, than later. By adding e-commerce inquiries to existing surveys we were able to begin collecting additional data at relatively low marginal cost in FY 2000. We had hoped that by providing the first official e-commerce measures this year and having a number of other surveys underway, our first mover status would help secure support for a FY 2001 e-business budget initiative that funds a comprehensive measurement program. In October 2000, we learned that this strategy was at least partially successful. The Congress provided $2.0 million of the $8.5 million requested for an expanded e-business measurement program.

- **Leverage our core competencies.** Faced with FY 2000 resource constraints, we wanted to leverage our experience and expertise in measuring transactions and take advantage of existing survey instruments. Consequently, we identified e-commerce as our initial measurement priority. By taking advantage of existing surveys we were able to collect additional e-commerce information at relatively low marginal cost.

- **Contract for e-business process expertise.** Understanding and measuring e-business processes has been identified as a second measurement priority.

We believe that e-business processes are significantly changing the ways business operate and that these changes may change the traditional view of the firm, are changing supply chains and the structure of many industries, and pose many challenges to existing and future statistical programs. While understanding e-business processes and their effects is likely to be far more important than quantifying e-commerce transactions, e-business processes are less well-defined, more closely linked with other business operations, and less easily measured in our existing programs. Rather than attempting to develop in-house business process expertise, we contracted with outside experts to help us better understand e-business processes and their effects. Two research projects are described later in the paper.

! **E-business measures should complement and improve our existing economic statistics.** E-business measures should not stand alone, but rather complement our existing measures. The practical outcome of this directive is to exploit existing surveys first, so e-business measures are conceptually consistent and comparable with broader measures of economic activity. Our measures of e-commerce have been developed by adding inquiries to existing surveys so the estimates can be compared to sector or industry totals. Furthermore, we used consistent definitions for measures whether the data are collected from brick-and-mortar, click-and-mortar, or pure plays. Similarly, when we develop e-business infrastructure measures we want them to be consistent with broader measures of investment and capital expenditures. Even our e-business measures will be linked to existing survey frames to better understand how these processes are changing firms, industries, and economic sectors.

! **Partner with government, business, and academia.** Our goal is to develop an e-business measurement program in collaboration with government, business, and academia. Definitions and underlying e-business measurement took into account work undertaken by other National statistical agencies,

private sector analysts, and the research community. Likewise, we have contracted with private sector experts to help us better understand e-business process effects and implications.

! **Employ e-business processes in business data collections.** The Census Bureau, like successful e-businesses, must itself exploit e-business processes and adopt more effective methods of operation. Expanded electronic reporting capabilities and a new Customer Relationship Management group are two attempts to employ the methods being used by successful e-businesses.

5. CENSUS BUREAU MEASUREMENT PLANS

In the Fall 1999, the Census Bureau began testing these definitions and concepts with businesses as we initiated a program to begin providing official measures of e-commerce activities as well as providing some limited information on e-business process usage. A more ambitious measurement program focusing on understanding and measuring e-business process effects, prioritizing and possibly quantifying e-business infrastructure, and significantly expanding the Census Bureau's use of e-business methods depends on additional funding being appropriated.

5.1 Produce first official measures of e-commerce

In FY 2000, we introduced e-commerce measures in a number of current economic surveys and initiated two research contracts. Our compressed time schedule and limited resources did not permit us to conduct a thorough record keeping practices study and we fully expected during these first collections to encounter unanticipated reporting problems and to identify additional measurement issues and complexities. Specific FY 2000 activities are described below.

! **Began collecting monthly e-commerce retail sales.** In August we mailed a screener to almost 8,000 retail firms in the monthly retail survey sample and

asked if they currently sold online or had plans to start by the end of the year. Those that responded affirmatively or did not respond, were mailed a form with e-commerce questions in October. We continue to collect the data monthly and publish quarterly estimates. The first official retail e-commerce estimates were released on March 2, 2000, covering the fourth quarter 1999. Since then we have also released estimates for the first, second, and third quarters of 2000. The fourth quarter 2000 releases will be available in mid-February 2001. The actual data are available online at http://www.census.gov/econ/www/ebusiness614.htm

! **E-commerce inquiries added to several annual surveys.** We added e-commerce sales questions to annual surveys covering retail trade (22,000 firms), wholesale trade (6,900 firms), accommodations and food services, and the rest of the NAICS services sectors (51,000). Firms were asked to report their e-commerce sales for both 1999 and 1998. Retailers and wholesalers were also asked if they were purchasing goods, supplies, or services over computer-mediated networks.

In addition, for nonstore retailers (catalog and electronic shopping sites), and all computer, software, and office supply firms we collected supplemental information:

total sales and e-commerce sales by 14 commodity categories (books, CDs, computers, software, apparel, etc.)

e-commerce sales by class of customer (individuals, businesses, government), and total foreign e-commerce sales (percent ranges of total e-commerce sales).

Report forms covering reference year 1999 were mailed in March-April 2000. Data review and dissemination will occur in FY 2001 with data available in late February 2001.

! **1999 Annual Survey of Manufactures Supplement.** A special supplement was developed that will collect data from some 50,000 manufacturing plants on:

E-commerce sales and purchases

Types of information (design specifications, product descriptions, demand projections, orders, inventory, production schedules, and so on) manufacturers are sharing online with suppliers and customers

E-business processes use (present and planned). Over 25 specific e-business processes are identified.

The supplement was mailed to the plant managers in June 2000 with results available in late February 2001. The report form is available online at http://www.census.gov/mcd/ma1000ec.pdf

! **E-business Research Studies.** We have two research studies underway. We have contracted with Pembroke Consulting (Dr. Adam Fein) to study changing supply chain industries and organizations. Deliverables included a description of the changing supply chain, implications for Census Bureau measurement programs, and specific recommendations regarding how to better capture and describe supply chain activities in the 2002 Economic Census and in our current economic statistics. We plan to add a number of check box inquiries to 2002 Economic Census forms for wholesalers, retailers, and transportation establishments to identify what supply chain functions are being provided by different establishments in the supply chain.

A second contract is with IBM Global Services. In phase 1, IBM and Dr. Jeff Sampler are developing a framework for analyzing future e-business trends and their impact. Special focus is being placed on the information technology drivers of e-business, will describe how these drivers are affecting the value-chain and help us identify the implications for Census measurement programs. The second research component being led by Dr. Hal Varian assessed how well NAICS captures e-business activities and identified possible gaps. The research results found that NAICS was doing a very good job classifying

various kinds of
e-businesses but that additional information would have to be collected to better understand the myriad activities these firms are engaged in. This finding reinforced the importance of a separate initiative we have underway with Mexico and Canada to develop a North American Product Classification System, initially focusing on identifying the products of service industries. In the 2002 Economic Census we will collect data on over 1000 new service products from about 65 industries including all the industries in the Information Sector.

5.2 FY 2001 E-business Budget Initiative ($8.5 million).

The FY 2001 budget initiative would have funded the implementation of an ambitious e-business measurement program extending the program started this year. The Congress provided $2.0 million of the $8.5 million request. With the exception of e-business infrastructure measures, we will undertake the following activities:

- **Provide e-commerce measures for most economic sectors and their associated industries.** While it was relatively inexpensive to add inquiries to existing surveys in FY 2000, additional funds are needed to process, review, and prepare data products covering manufacturing, wholesale, retail, food services and accommodations, and service industries. In fact, we took some risk adding inquiries to a number of surveys with no certainty that additional funds would be appropriated in FY 2001. On the other hand, establishing our agency as first mover has earned many accolades and helped secure some additional funding in FY 2001. These programs will be continued next year.

- **Complement our business e-commerce measures with household data.** We are developing a series of e-commerce questions that will be included in a special Internet supplement on the monthly Current Population Survey. The September 2001 CPS supplement will collect data on the devices household members are using to access the Internet, collect information on types of

e-commerce purchases, and provide new insights how consumers are using the Internet when shopping for an auto. This initiative will be conducted.

- **Deliver first official baseline measures of e-business process usage** by manufacturing industries. In addition, data from the ASM supplement will be linked to the full ASM data set permitting us to assess the effect of e-business processes on individual plants, firms, and industries. The initial results of the survey will be provided in May 2001. Analysis of the linked data sets will begin in Summer 2001. Next year, we will not collect the e-business process use information because of the reduction in the FY 2001 funding request.

- **Include coverage of electronic marketplaces** and other important distribution channels in the annual wholesale trade survey. A new survey of supply chain organizations is being considered to help us understand changing functions and activities among supply chain firms. This survey will focus on two or three indicators and be conducted in late 2001, if funding is available.

- **Develop e-business infrastructure measures.** Key activities will include identification of priority measures, assessment of data availability and record keeping practices, and initiation of data collection. We have invited suggestions on key measures that should be considered for collection, but have received few specific suggestions. At the reduced funding level, we will be unable to introduce a new survey, but are assessing whether we could add questions to the Annual Capital Expenditures Survey.

- **Employ e-business processes in business data collections**. Our goals are to ease reporting burden and increase efficiency in data collection programs. Deliverables include an Internet reporting capability for all 5 million businesses included in the 2002 Economic Census; establishment of a Customer Relationship Management staff to coordinate and improve communication with the largest companies and facilitate their responses to information requests from separate Census Bureau data programs; and

development of an Internet-based customer support system for the 2002 Economic Census to provide on-line information and technical assistance to census respondents. We are moving forward on all of these initiatives.

6. LESSONS LEARNED

This past year has been exciting and challenging. The Census Bureau has embarked on an ambitious e-business measurement program and the response to our initial efforts has been encouraging and supportive. Nonetheless, we fully recognize that e-business is in its infancy, is changing rapidly and that the most difficult measurement challenges lay ahead of us. Nonetheless, implementing an aggressive measurement program has provided us with some valuable lessons.

- **Definitions and concepts are important.** We spent almost six months developing definitions and a framework for measuring e-business and this was time well spent. We found that it has been essential to use precise terms to discuss e-business transactions, processes, and the underlying infrastructure. These definitions supplemented with specific examples have been especially useful in discussing measurement plans and priorities with policymakers, business, and other statistical agencies.

  While during our deliberations we agonized over specific words and examples, we decided for collection purposes to keep the instructions simple and straight forward. Consequently, we have tried to avoid overly technical definitions of communication protocols and such and have tried to craft questions in language that accountants would understand. In our instructions we also provide clarifying examples to better communicate with respondents, such as descriptions of computers and electronic devices that communicate interactively over various types of networks.

We began field testing our e-commerce definition in November 1999 with the monthly retail survey, in March-April 2000 with our non manufacturing annual surveys, and in June 2000 for the manufacturing supplement. The initial results have been encouraging; the vast majority of businesses understand our definitions and instructions and we have had very few questions. The retailers have had few, if any problems, with the definitions. The manufacturing e-business supplement was our first test of our e-business processes definitions. We targeted the manufacturing plant manager, not the accounting department, so we expected a high degree of familiarity with existing processes and the degree of integration with vendors and customers. We did a small scale cognitive test prior to mail out, and discovered that Extranet was a term that is unfamiliar to many plant managers. Another confusing term was computer-mediated networks, though most respondents seemed to understand the examples attached with the term. To help us identify possible problems and confusing terms and questions, the Internet version of the report form invited specific feedback regarding definitions, terms and instructions.

! **Expect the unexpected.** As in any statistical program the survey responses do not always seem logical. For example, in our manufacturing supplement we have had a couple of manufacturers that claim that they have no network connections at the plant, yet they filed their report forms via the Internet. In some service industries that seem unlikely to have e-commerce sales we have a few companies reporting such sales. We are following up all suspicious cases and hope to refine definitions and examples as needed.

! **Distinction between e-commerce transactions, e-business processes, and the e-business infrastructure is not obvious.** This lesson was learned as a result of a series of meetings with Census Bureau staff that have responsibility for processing e-commerce measures but who had not been involved in the development of specific definitions. While everyone understood the

e-commerce definition, understanding of e-business processes was mixed, and they were also unclear about how we would characterize the e-business infrastructure. To address this problem we have introduced a number of briefing sessions to discuss particular examples and answer specific questions.

! **Measures can be problematic.** Developing e-commerce measures for retail trade, wholesale trade, and manufacturing were relatively straight forward. Developing e-commerce measures for many service industries has proved to be more challenging and this first year's experience will help improve subsequent measures. We are not alone in this arena. The Financial Accounting Standards Board (FASB) as well as the Securities and Exchange Commission have struggled with issues concerning the recognition and measurement of e-commerce transactions. Recently the FASB's Emerging Issues Task Force (EITF) issued three consensus conclusions that will significantly impact revenue recognition for e-commerce companies. The issued covered included:

Redefining revenue to include shipping and handling fees (EITF 00-10). Previously these items were reported net of costs under generally accepted accounting principles (GAAP).

Severely restricting the reporting of gross commission income for agents and brokers (EITF 99-19) as revenue. Under EITF 99-19 most companies will be required to report commission revenue net of costs.

Severely restricting the reporting of barter transactions not involving the exchange of money (EITF 99-17) as revenue. Previously internet based e-commerce companies had been including barter transactions, like advertising, in their revenue.

The impact of these rulings will not only have to be taken into account in what it is we are asking (stakeholder dependent), but how we are asking the

questions (clear and unambiguous definitions) and making sure the data are being reported consistently during the adoption phase. This latter impact may very well lead to revisions in our data.

The manufacturing supplement was our first foray into e-business process measurement and we have found that it was critically important to work with industry experts in identifying the processes. While we expect some commonality in processes across sectors, we believe that there also will be substantial differences, so compiling a comprehensive list will be difficult and time consuming. The measure of e-business process "use" has proved relatively straightforward, but we have little information that documents or explains these changes or assess their impact on existing measures of economic activity. Understanding and quantifying e-business process effects is going to be difficult and will likely require innovative and nontraditional methods and we welcome any and all suggestions.

! **The statistical unit and the survey instrument place significant constraints on what can be collected.** Our economic census program generally collects data for the individual location or establishment while most of our current surveys collect data for the enterprise or subsidiary, with survey forms generally are directed to the accounting department within the firm. We are successfully collecting e-commerce sales data from both enterprises and establishments, but accountants are not the appropriate group from which to collect information about e-business process use. Consequently, we believe we will have to create new survey vehicles that can target the plant manager, the chief information or technology officer to collect e-business process information. Finally, information about the e-business infrastructure is probably going to have to be collected at the enterprise rather than the establishment level just as we do in our Annual Capital Expenditures Survey.

! **Start small, leverage your existing resources**. Constrained budget resources in FY 2000 prohibited us from considering stand-alone e-business surveys or

programs. By adding questions to our existing surveys we were able to mobilize quickly, minimize data collection costs, and provide e-commerce baseline measures which can be related to broader measures of economic activity. Taking advantage of our transaction expertise, we first focused on e-commerce measures. As our understanding of e-business processes increased we developed the manufacturing supplement. This approach has served us well and we expect the results from these initial collections will not only provide useful summary statistics but also will further our staff's understanding of e-business. Our focus on e-business within the context of our existing programs also has had an unanticipated benefit in that it has forced us to address a long list of measurement issues related to coverage, classification, valuation, and so on. These issues are not new or associated only with e-business, but a new e-business perspective has caused us to take a fresh look at them.

! **Do not expect much help in establishing e-business measurement priorities.** One of our measurement strategies was to partner with government, business, and academia in developing an e-business measurement program. We have done a good job of keeping these constituencies informed of our definitions, measurement strategies and survey plans and have invited feedback on all of these items. The Census Bureau web site has served as an excellent vehicle for communicating our definitions and measurement plans to a broad audience. The inclusion of specific examples of e-commerce transactions and e-business processes has generated many useful comments and suggestions. We have had no success in eliciting suggestions about needed measures or priority data variables. We have invited analysts, policymakers, and researchers to specify the questions they would like our e-commerce, e-business processes, or e-business infrastructure measures to answer, but have received very few suggestions. We have been much more successful in developing a draft questionnaire and then asking different parties to comment. This worked quite successfully with the manufacturing e-business supplement. We expect to take the same approach as we begin

developing our first e-business infrastructure measures. We also are hopeful that once we begin releasing the annual survey results in late February 2001, this will generate new data requests.

7. CONCLUSION

Measuring the electronic economy poses new challenges to the Census Bureau and other statistical agencies. We are excited about what we have accomplished, but realize much more remains to be done. We invite feedback on our definitions, measurement strategy and plans. We also are very interested in other organizations and countries' experiences measuring e-business activity and invite them to share them with us. Please forward your comments, experiences, and suggestions to Thomas L. Mesenbourg at tmensenbo@census.gov